CLAIMS

1. A picture processing apparatus for processing picture data made up of a predetermined number of pixel data acquired by an imaging device having a predetermined number of pixels each having an integrating effect, said picture processing apparatus comprising:

processing unit decision means for deciding, based on area information specifying a foreground area made up only of foreground object components making up a foreground object in said picture data, a background area made up only of background object components making up a background object in said picture data, and a mixed area which is a mixture of said foreground object components and the background object components in said picture data; said mixed area including a covered background area formed at a leading end in a movement direction of said foreground object, and an uncovered background area formed at a trailing end of said foreground object, a processing unit made up of pixel data lying on at least a straight line extending in a direction coincident with the direction of movement of said foreground object from an outer end of said covered background area to an outer end of said uncovered background area, centered about said foreground area;

normal equation generating means for generating a normal equation by setting pixel values of pixels in said processing unit decided based on said processing unit and a dividing value which is an unknown dividing value obtained on dividing said foreground object components in said mixed area with a predetermined dividing

number; and

calculating means for solving said normal equation by the least square method to generate foreground object components adjusted for the quantity of movement blurring.

2. The picture processing apparatus according to claim 1 wherein said calculating means generates said foreground object components adjusted for the movement blurring quantity based cn th movement quantity of said foreground object.

3. The picture processing apparatus according to claim 2 wherein said calculating means generates said foreground object components freed of the movement blurring based on the movement quantity of said foreground object.

4. The picture processing apparatus according to claim 1 wherein said calculating means adjusts the movement blurring quantity based on a predetermined value.

5. The picture processing apparatus according to claim 1 wherein said calculating means solves said normal equation to calculate said dividing value and performs predetermined calculations on said dividing value to generate said foreground object adjusted for the movement blurring quantity.

6. The picture processing apparatus according to claim 1 further comprising:

area information generating means for specifying said foreground area, said background area and the mixed area including said covered background area and the uncovered background area for generating the area information representing said foreground area, said background area and the mixed area including said covered

background area and the uncovered background area.

7. The picture processing apparatus according to claim 1 further comprising:

mixing ratio detection means for detecting a mixing ratio between said foreground object components and said background object components in at least said mixed area.

8. The picture processing apparatus according to claim 1 further comprising:

separating means for separating said foreground object and said background object based on said area information and the mixing ratio.

9. A picture processing method for processing picture data made up of a predetermined number of pixel data acquired by an imaging device having a predetermined number of pixels each having an integrating effect, said picture processing method comprising:

a processing unit decision step of deciding, based on area information specifying a foreground area made up only of foreground object components making up a foreground object in said picture data, a background area made up only of background object components making up a background object in said picture data, and a mixed area which is a mixture of said foreground object components and the background object components in said picture data, said mixed area including a covered background area formed at a leading end in a movement direction of said foreground object, and an uncovered background area formed at a trailing end of said foreground object, a processing unit made up of pixel data lying on at least a straight

line extending in a direction coincident with the direction of movement of said foreground object from an outer end of said covered background area to an outer end of said uncovered background area, centered about said foreground area;

a normal equation generating step of generating a normal equation by setting pixel values of pixels in said processing unit decided based on said processing unit and a dividing value which is an unknown dividing value obtained on dividing said foreground object components in said mixed area with a predetermined dividing number; and

a calculating step of solving said normal equation by the least square method to generate foreground object components adjusted for the quantity of movement blurring.

10. A picture processing program for processing picture data made up of a predetermined number of pixel data acquired by an imaging device having a predetermined number of pixels each having an integrating effect, said picture processing program comprising:

a processing unit decision step of deciding, based on area information specifying a foreground area made up only of foreground object components making up a foreground object in said picture data, a background area made up only of background object components making up a background object in said picture data, and a mixed area which is a mixture of said foreground object components and the background object components in said picture data, said mixed area including a

covered background area formed at a leading end in a movement direction of said foreground object, and an uncovered background area formed at a trailing end of said foreground object, a processing unit made up of pixel data lying on at least a straight line extending in a direction coincident with the direction of movement of said foreground object from an outer end of said covered background area to an outer end of said uncovered background area, centered about said foreground area;

a normal equation generating step of generating a normal equation by setting pixel values of pixels in said processing unit decided based on said processing unit and a dividing value which is an unknown dividing value obtained on dividing said foreground object components in said mixed area with a predetermined dividing number; and

a calculating step of solving said normal equation by the least square method to generate foreground object components adjusted for the quantity of movement blurring.

11. A signal processing apparatus for processing detection data, acquired every predetermined time period by a sensor made up of a predetermined number of detection elements having time-integrating effects, every predetermined time period, said signal processing apparatus comprising:

foreground sample data extracting means for extracting said sample data present in detection data before or after considered detection data where there exists considered sample data which is the sample data under consideration, as foreground

sample data corresponding to an object proving the foreground in the real world;

background sample data extracting means for extracting said sample data present in detection data lying after or before the considered detection data where there exists considered sample data which is the sample data under consideration, as background sample data corresponding to an object proving the background in the real world; and

detection means for detecting a mixing ratio of said considered sample data based on said considered sample data, said foreground sample data and said background sample data.

12. The signal processing apparatus according to claim 11 further comprising:

area specifying means for specifying the foreground area made up only of foreground object components of said sample data, the background area made up only of background object components and the mixed area mixed from said foreground object components and the background object components;

said foreground sample data extraction means extracting said foreground sample data based on results specified by said area specifying means;

said background sample data extraction means extracting said background sample data based on the results specified by said area specifying means.

13. The signal processing apparatus according to claim 12 wherein said area specifying means further discriminates said mixed area into a covered background area and an uncovered background area;

said detection means detecting the mixing ratio of said considered sample data based on said considered sample data, said foreground sample data and the background sample data as a result of discrimination of said covered background area and the uncovered background area.

14. The signal processing apparatus according to claim 11 wherein said detection data is picture data.

15. The signal processing apparatus according to claim 11 wherein said detection means divides a difference between said considered sample data and said foreground sample data by a difference between said background sample data and the foreground sample data to detect the mixing ratio of said considered sample data.

16. The signal processing apparatus according to claim 11 wherein said detection means detects the mixing ratio of said considered sample data based on said considered sample data containing background object components making up the still background in the real world, said considered sample data, containing substantially the same foreground object components and on said foreground sample data.

17. A signal processing method for processing detection data, acquired every predetermined time period by a sensor made up of a predetermined number of detection elements having time-integrating effects, every predetermined time period, said signal processing method comprising:

a foreground sample data extracting step of extracting said sample data present in detection data before or after considered detection data where there exists

considered sample data which is the sample data under consideration, as foreground sample data corresponding to an object proving the foreground in the real world;

a background sample data extracting step of extracting said sample data present in detection data lying after or before the considered detection data where there exists considered sample data which is the sample data under consideration, as background sample data corresponding to an object proving the background in the real world; and

a detection step of detecting a mixing ratio of said considered sample data based on said considered sample data, said foreground sample data and said background sample data.

18. A signal processing program for processing detection data, acquired every predetermined time period by a sensor made up of a predetermined number of detection elements having time-integrating effects, every predetermined time period, said signal processing program comprising:

a foreground sample data extracting step of extracting said sample data present in detection data before or after considered detection data where there exists considered sample data which is said sample data under consideration, as foreground sample data corresponding to an object proving the foreground in the real world;

a background sample data extracting step of extracting said sample data present in detection data lying after or before the considered detection data where there exists considered sample data which is the sample data under consideration, as background sample data corresponding to an object proving the background in the real world; and

a detection step of detecting a mixing ratio of said considered sample data based on said considered sample data, said foreground sample data and said background sample data.

19. A signal processing apparatus for processing detection data, acquired every predetermined time period by a sensor made up of a predetermined number of detection elements having time-integrating effects, every predetermined time period, said signal processing apparatus comprising:

still/movement decision means for deciding still/movement based on said detection data; and

detection means for detecting a mixed area containing sample data having plural real world objects mixed together based on the results of discrimination.

20. The signal processing apparatus according to claim 19 wherein said still/movement decision means includes first decision means for discriminating whether or not said sample data being discriminated has moved, before a reference time point, from a state in which the sample value data is substantially constant with lapse of time to a state in which the sample value data is changed with lapse of time, and second decision means for discriminating whether or not said sample data being discriminated has moved, after said reference time point, from a state in which the sample value data is changed with lapse of time to a state in which the sample value data is substantially constant with lapse of time;

said detection means detecting said sample data being discriminated as said

sample data belonging to said mixed area when said first decision means has decided that said sample data being discriminated has moved, before a reference time point, from a state in which the sample value data is substantially constant with lapse of time to a state in which the sample value data is changed with lapse of time, or when said second decision means has decided that said sample data being discriminated has moved, after said reference time point, from a state in which the sample value data is changed with lapse of time to a state in which the sample value data is substantially constant with lapse of time.

21. The signal processing apparatus according to claim 20 wherein when said first decision means has decided that said sample data being discriminated has moved, before a reference time point, from a state in which the sample value data is substantially constant to a state in which the sample value data is changed with lapse of time with lapse of time, said detection means detects said sample data being discriminated as said sample data belonging to a covered background area; and wherein

when said second decision means has decided that said sample data being discriminated has moved, after a reference time point, from a state in which the sample value data is changed with lapse of time to a state in which the sample value data is substantially constant with lapse of time, said detection means detects said sample data being discriminated as said sample data belonging to an uncovered background area

22. The signal processing apparatus according to claim 19 wherein said detection data

is picture data.

23. A signal processing method for processing detection data, acquired every predetermined time period by a sensor made up of a predetermined number of detection elements having time-integrating effects, every predetermined time period, said signal processing method comprising:

a still/movement decision step of deciding still/movement based on said detection data; and

a detection step of detecting a mixed area containing sample data having plural real world objects mixed together based on the results of discrimination.

24. A signal processing program for processing detection data, acquired every predetermined time period by a sensor made up of a predetermined number of detection elements having time-integrating effects, every predetermined time period, said signal processing program comprising:

a still/movement decision step of deciding still/movement based on said detection data; and

a detection step of detecting a mixed area containing sample data having plural real world objects mixed together based on the results of discrimination.

25. A signal processing apparatus comprising:

means for acquiring second signals of a second dimension by projecting first signals as real-world signals of a first dimension on a sensor and by detecting the mapped signals by said sensor, said first dimension being lower than said first

dimension; and

signal processing means for extracting the significant information, buried by said projection from said second signals, by performing signal processing which is based on said second signals.

26. The signal processing apparatus according to claim 25 wherein said significant information is the information for adjusting the distortion produced by projection.

27. The signal processing apparatus according to claim 26 wherein said sensor is made up of a plurality of detection elements having time integrating effects;

said acquisition means acquiring a plurality of detection signals for said respective detection elements, as detected by said sensor, as said second signals;

said distortion being the distortion caused by the time integrating effect.

28. The signal processing apparatus according to claim 27 wherein said acquisition means acquire said detection signals of a plurality of time units, as detected by plural detection elements of said sensor every predetermined time unit;

said signal processing means extracting said significant information for said second signal of a desired time based on plural detection signals of said plural time units.

29. The signal processing apparatus according to claim 25 wherein said second signals are picture signals.

30. The signal processing apparatus according to claim 25 wherein said signal processing means includes area specifying means for specifying a significant area and

the other areas in said second signal, said significant area containing the significant information buried by said projection, outputting the area information specifying the specified area as said significant information.

31. The signal processing apparatus according to claim 30 wherein said area information specifies the foreground area, as said other area, made up only of foreground object components constituting a foreground object, the background area made up only of background object components constituting a background object, as said other area, and the mixed area mixed from said foreground object components and the background object components.

32. The signal processing apparatus according to claim 31 wherein said area information contains the information for discriminating said mixed area into a covered background area and an uncovered background area.

33. The signal processing apparatus according to claim 30 wherein said signal processing means further includes significant information extracting means for extracting said significant information from an area containing said significant information specified by said area specifying means.

34. The signal processing apparatus according to claim 33 wherein said significant information specifies a mixing ratio of said foreground components and the background components in said mixed area of said second signal made up of a foreground area comprised only of foreground object components constituting the foreground objects, a background area comprised only of background object

components constituting the background objects and a mixed area mixed from said foreground object components and said background object components.

35. The signal processing apparatus according to claim 33 wherein said signal processing means further includes distortion adjustment means for adjusting the amount of distortion produced in said second signal by said projection based on said significant information.

36. The signal processing apparatus according to claim 35 wherein said distortion adjustment means reduces the amount of said distortion.

37. The signal processing apparatus according to claim 35 wherein said distortion adjustment means eliminates said distortion.

38. The signal processing apparatus according to claim 35 wherein said distortion is movement blurring produced in said foreground object.

39. The signal processing apparatus according to claim 38 wherein said signal processing means further includes object movement detection means for detecting the movement quantity of said foreground object; and wherein

said distortion adjustment means adjusts the quantity of movement blurring which is said distortion based on said movement quantity of said foreground object.

40. The signal processing apparatus according to claim 25 wherein said signal processing means extracts, as said significant information, a mixing ratio of foreground object components and the background object components in said mixed area of said second signal made up of a foreground area comprised only of foreground

object components constituting the foreground object, a background area comprised only of background object components constituting the background object and a mixed area mixed from said foreground object components and said background object components.

41. The signal processing apparatus according to claim 40 wherein said signal processing means further includes distortion adjustment means for adjusting the amount of distortion produced in said second signal by said projection based on said significant information.

42. The signal processing apparatus according to claim 41 wherein said distortion adjustment means reduces the amount of said distortion.

43. The signal processing apparatus according to claim 41 wherein said distortion adjustment means eliminates said distortion.

44. The signal processing apparatus according to claim 41 wherein said distortion is movement blurring produced in said foreground object.

45. The signal processing apparatus according to claim 44 wherein said signal processing means further includes object movement detection means for detecting the movement quantity of said foreground object; and wherein

said distortion adjustment means adjusts the quantity of movement blurring which is said distortion based on said movement quantity of said foreground object.

46. The signal processing apparatus according to claim 40 wherein said signal processing means extracts said mixing ratio as said significant information based on

said second signal; and wherein

said signal processing means extracts said area information indicating said foreground area, background area and the mixed area from said second signal as said significant information.

47. The signal processing apparatus according to claim 46 wherein said signal processing means separates said foreground object comprised only of said foreground object components from said background object comprised only of background object components based on said mixing ratio and said area information.

48. The signal processing apparatus according to claim 47 wherein said signal processing means further includes distortion adjustment means for adjusting movement blurring as said distortion produced in said foreground object.

49. The signal processing apparatus according to claim 48 wherein said signal processing means further includes object movement detection means for detecting the movement quantity of said foreground object;

said distortion adjustment means adjusting the quantity of movement blurring, which is said distortion, based on the motion quantity of said foreground object.

50. The signal processing apparatus according to claim 47 wherein said signal processing means synthesizes said foreground object with an optional background picture.

51. A signal processing method comprising:

a signal acquisition step of acquiring a second signal by projecting a first signal

as a real world signal of a first dimension on a sensor and detecting the so-mapped first signal by said sensor, said second signal being of a second dimension lower than said first dimension; and

a signal processing step of performing signal processing based on said second signal to extract the significant information buried by projection from said second signal.

52. A recording medium having recorded thereon a computer-readable program, said program comprising:

a signal acquisition step of acquiring a second signal by projecting a first signal as a real world signal of a first dimension on a sensor and detecting the so-mapped first signal by said sensor, said second signal being of a second dimension lower than said first dimension; and

a signal processing step of performing signal processing based on said second signal to extract the significant information buried by projection from said second signal.

53. A signal processing apparatus comprising:

signal acquisition means for acquiring a second signal by detecting a first signal as a real world signal of a first dimension by a sensor, said second signal being of a second dimension lower than said first dimension and containing distortion with respect to said first signal; and

signal processing means for performing signal processing on said second signal

for generating a third signal alleviated in distortion as compared to said second signal.

54. The signal processing apparatus according to claim 53 wherein said sensor is made up of a plurality of detection elements having time integrating effects as said distortion;

said acquisition means acquiring a plurality of detection signals detected by said sensor for said respective detection elements as said second signals;

said signal processing means performing signal processing on said second signal to generate said third signal, made up of a plurality of sample data corresponding to said detection signals, alleviated in time integrating effects.

55. The signal processing apparatus according to claim 54 wherein if a first object in the real world and a second object performing relative movement with respect to the first object are detected by said sensor, said signal processing means alleviates, by said signal processing, the distortion caused by the mixing of said first object and the second object due to time integrating effects of said sensor in the vicinity of a boundary between said first and second objects.

56. The signal processing apparatus according to claim 55 wherein said acquisition means acquire said detection signals of a plurality of time units, as detected by plural detection elements of said sensor every predetermined time unit;

said signal processing means alleviating, by said signal processing, the distortion caused in the vicinity of the boundary between said first and second objects represented by said second signal corresponding to a desired time unit based on said

detection signal of plural time units.

57. The signal processing apparatus according to claim 54 wherein if a first object in the real world and a second object performing relative movement with respect to the first object are detected by said sensor, said signal processing means separates one of said first and second objects, from said first and second objects mixed in said second signal, to output the separated one of said first and second objects as said third signal.

58. The signal processing apparatus according to claim 53 wherein said sensor converts electromagnetic waves, inclusive of light, as said first signal, into picture signals, as said second signal, by photoelectric conversion.

59. The signal processing apparatus according to claim 53 wherein said sensor is a thermograph device for measuring the temperature.

60. The signal processing apparatus according to claim 53 wherein said sensor is a pressure sensor.

61. The signal processing apparatus according to claim 53 wherein said sensor generates said second signals every predetermined time period.

62. The signal processing apparatus according to claim 53 wherein said sensor has a plurality of detection elements each having a spatial integrating effects;

said acquisition means performing signal processing on said second signals to generate said third signal comprised of a plurality of detection signals alleviated in spatial integrating effects, as said distortion, caused by projection.

63. The signal processing apparatus according to claim 62 wherein said sensor is a

plurality of detection elements, arrayed in a predetermined direction, which is at least one direction;

said signal processing means including

correlation detection means for detecting the correlation between two sample data of said second signal neighboring to each other in said predetermined direction; and

double-density sample generating means for generating, for respective considered sample data, a first sample value, as a sample value of higher correlation, based on a sample value of a side of higher correlation of said two neighboring sample data, generating, for respective considered sample data, a second sample value, as a sample value of a side of lower correlation, based on sample values of said considered sample data and said first sample value, and for outputting said first and second sample values as two sample values of said third signal corresponding to said sample under consideration.

64. The signal processing apparatus according to claim 63 wherein said sensor is provided with said plural detection elements, arranged in a matrix;

said predetermined direction being at least one of the horizontal and vertical directions in the matrix arrangement.

65. The signal processing apparatus according to claim 64 wherein said signal processing means doubles the density in both the horizontal and vertical directions.

66. The signal processing apparatus according to claim 63 wherein said correlation

is the difference of said sample data.

67. The signal processing apparatus according to claim 63 wherein said acquisition means acquires said second signal from said plural detection elements every predetermined time.

68. A signal processing method comprising:

a signal acquisition step of acquiring a second signal by detecting a first signal as a real world signal of a first dimension by a sensor, said second signal being of a second dimension lower than said first dimension; and

a signal processing step of performing signal processing on said second signal to generate a third signal alleviated in distortion as compared to said second signal.

69. A recording medium having a computer-readable program, recorded thereon, said computer-readable program comprising:

a signal acquisition step of acquiring a second signal by detecting a first signal as a real world signal of a first dimension by a sensor, said second signal being of a second dimension lower than said first dimension said signal being of a second dimension lower than said first dimension; and

a signal processing step of performing signal processing on said second signal to generate a third signal alleviated in distortion as compared to said second signal.

70. A signal processing apparatus for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements having time integrating effects, said signal processing apparatus comprising:

area specifying means for specifying a foreground area made up only of foreground object components constituting an foreground object, a background area made up only of background object components constituting a background object, and a mixed area mixed from said foreground object components and the background object components;

mixing ratio detection means for detecting a mixing ratio of said foreground object components and said background object components at least in said mixed area; and

separating means for separating said foreground object and said background object from each other based on the specified results by said area specifying means and said mixing ratio.

71. The signal processing apparatus according to claim 70 further comprising:

movement blurring quantity adjustment means for adjusting the movement blurring quantity of said foreground object.

72. A signal processing method for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements having time integrating effects, said signal processing method comprising:

an area specifying step of specifying a foreground area, made up only of foreground object components constituting an foreground object, a background area made up only of background object components constituting a background object, and a mixed area mixed from said foreground object components and the background

object components;

a mixed area detection step of detecting a mixing ratio of said foreground object components and said background object components at least in said mixed area; and

a separating step of separating said foreground object and said background object from each other based on the specified results by said area specifying means and said mixing ratio.

73. A recording medium having a computer-readable program, recorded thereon, said computer-readable program comprising:

an area specifying step of specifying a foreground area, made up only of foreground object components constituting an foreground object, a background area made up only of background object components constituting a background object, and a mixed area mixed from said foreground object components and the background object components;

a mixed area detection step of detecting a mixing ratio of said foreground object components and said background object components at least in said mixed area; and

a separating step of separating said foreground object and said background object from each other based on the specified results by said area specifying means and said mixing ratio.

74. A signal processing apparatus for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements having time integrating effects, said signal processing apparatus comprising:

area specifying means for specifying a foreground area, made up only of foreground object components constituting an foreground object, a background area made up only of background object components constituting a background object, and a mixed area mixed from said foreground object components and the background object components; and

mixing ratio detecting means for detecting a mixing ratio between said foreground object components and said background object components at least in said mixed area based on the results specified by said area specifying means.

75. The signal processing apparatus according to claim 74 further comprising:

separating means for separating said foreground object and said background object from each other based on said mixing ratio.

76. The signal processing apparatus according to claim 74 further comprising:

movement blurring quantity adjustment means for adjusting the quantity of movement blurring contained in said foreground object.

77. The signal processing apparatus according to claim 76 further comprising:

movement detection means for detecting the movement of at least one of said foreground object and said background object;

said movement blurring adjustment means adjusting the movement blurring quantity based on the detected movement.

78. A signal processing method for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements

having time integrating effects, said signal processing method comprising:

an area specifying step of specifying a foreground area, made up only of foreground object components constituting an foreground object, a background area made up only of background object components constituting a background object, and a mixed area mixed from said foreground object components and the background object components; and

a mixing ratio detecting step of detecting a mixing ratio between said foreground object components and said background object components at least in said mixed area based on the results specified by said area specifying means.

79. A recording medium having a computer-readable program recorded thereon, said signal processing method for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements having time integrating effects, said computer-readable program comprising:

an area specifying step of specifying a foreground area, made up only of foreground object components constituting an foreground object, a background area made up only of background object components constituting a background object, and a mixed area mixed from said foreground object components and the background object components; and

a mixing ratio detecting step of detecting a mixing ratio between said foreground object components and said background object components at least in said mixed area based on the results specified by said area specifying means.

80. A signal processing apparatus for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements having time integrating effects, said signal processing apparatus comprising:

mixing ratio detecting means for detecting a mixing ratio of foreground object components and background object components in a mixed area in which said foreground object components constituting a foreground object and said background object components constituting a background object are mixed; and

separating means for separating said foreground object and said background object from each other based on said mixing ratio.

81. The signal processing apparatus according to claim 80 further comprising:

movement blurring quantity adjustment means for adjusting the movement blurring quantity of said foreground object.

82. The signal processing apparatus according to claim 81 further comprising:

movement detection means for detecting the movement of at least one of said foreground object and said background object;

said movement blurring adjustment means adjusting the movement blurring quantity based on the detected movement.

83. A signal processing method for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements having time integrating effects, said signal processing method comprising:

a mixing ratio detecting step of detecting a mixing ratio of foreground object

components and background object components in a mixed area in which said foreground object components constituting a foreground object and said background object components constituting a background object are mixed; and

a separating step of separating said foreground object and said background object from each other based on said mixing ratio.

84. A recording medium having recorded thereon a computer-readable program for processing a predetermined number of detection signals acquired by a sensor made up of a predetermined number of detection elements having time integrating effects, said computer-readable program comprising:

a mixing ratio detecting step of detecting a mixing ratio of foreground object components and background object components in a mixed area in which said foreground object components constituting a foreground object and said background object components constituting a background object are mixed; and

a separating step of separating said foreground object and said background object from each other based on said mixing ratio.